

# DTSC Workshop

## Proposed Regulations Photovoltaic (PV) Modules



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# Agenda (*Interactive Session*)

- What is a PV Module?
- Regulatory Background
- Review of Health and Safety Code, section 25259 (SB 489 - Monning, Chapter 419, Statute 2015)
- Industry Perspective
- Draft Proposed Regulations (*based on 2013 proposed regulations*)
- What may Change?

# What is a PV Module?

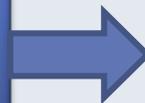
## Solar Cell

- made of semiconductor material that absorbs photons of sunlight
- Below antireflective surface

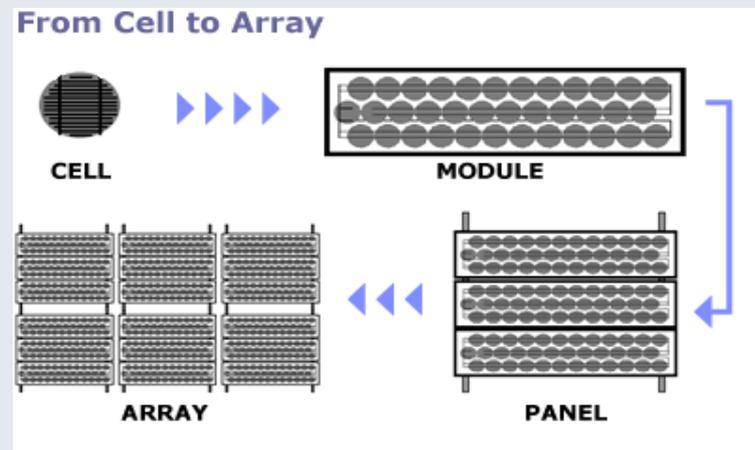
## PV modules

- solar cells soldered together in a series

Solar Panels made up of PV modules



Panels form array



# When Do PV Modules (*Solar Panels*) Become a Waste?

- When it is discarded – abandoned, relinquished or recycled
- Unused – discarded (ie: damaged during installation)
- Used PV Modules - disconnected and removed from service



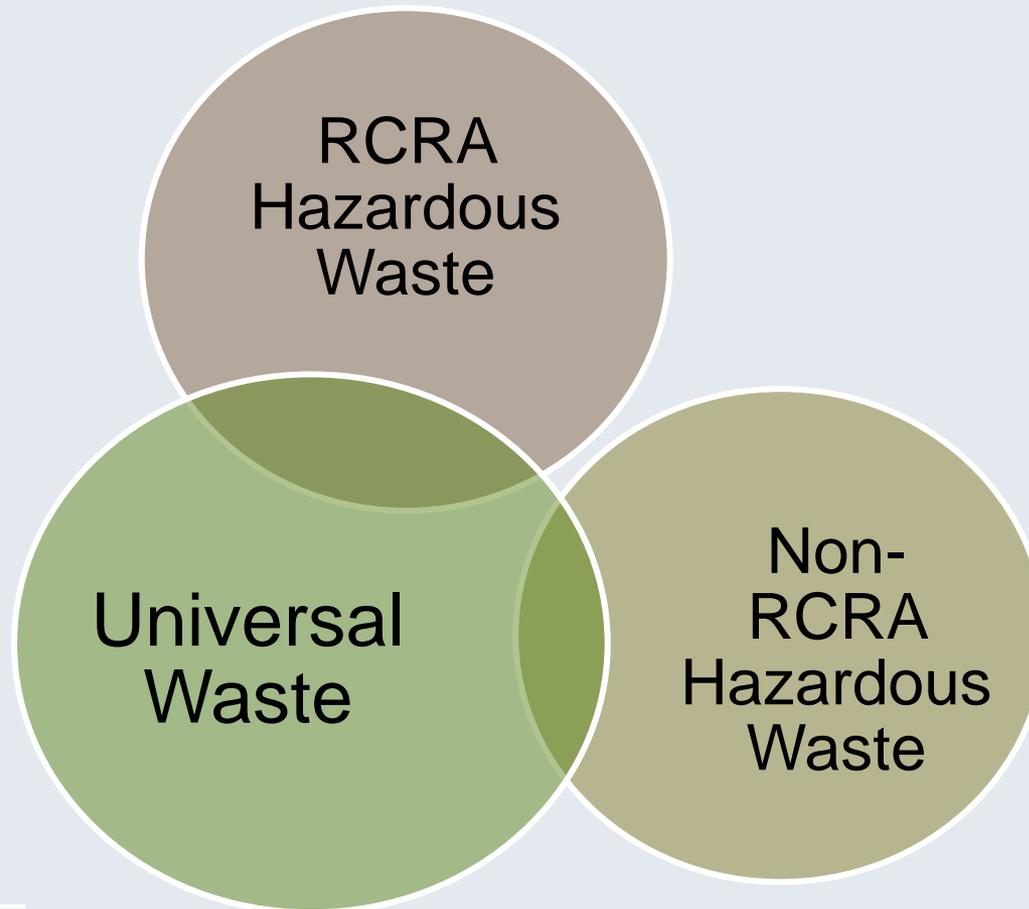
# How Are PV Modules (Solar Panels) Hazardous?

- Laboratory analysis show PV Modules (solar panels) contain heavy metals that exhibit hazardous waste characteristics (such as antimony, arsenic, cadmium, lead, or selenium)
- Older units may have lead solders and Chromium(vi) (Cr<sup>6+</sup>)



*Consult with manufacturers of solar products to determine constituents.*

# RCRA Hazardous Vs Non - RCRA Hazardous Waste



# Regulatory Background

## History of PV Modules Regulation Development in California

2010 Draft  
Regulations

2013 Draft  
Regulations

OAL's  
Review

SB 489  
2015

# Health and Safety Code, Section 25259 (*SB 489 - Monning, Chapter 419, Statute 2015*)

- HSC - DIVISION 20, CHAPTER 6.5  
Hazardous Waste Control Law,  
ARTICLE 17. Photovoltaic Modules
- Effective Jan. 1, 2016



*“The department may, by regulation, designate end-of-life photovoltaic modules that are identified as hazardous waste as a universal waste and subject those modules to universal waste management.”*

# Industry Perspective

- Products (current and upcoming)
- Recycling process



# Questions



# Draft Proposed Regulations

- Based on 2013 proposed regulations



- Removed proposed regulations that would provide conditional exemption

# Chapter 23 sections

## Standards for Universal Waste Management



# § 66273.7.1- Applicability- *Photovoltaic Modules*

(a) Article applies to PV Modules as defined in 66273.9

(b) does not cover

- not yet waste
- does not exhibit characteristics
- destined for recycling
- managed as a hazardous waste
- previously a waste but no longer (eg. refurbished and returned to service)



## § 66273.7.1- Applicability- Cont.

(c) Becomes a waste when:

- PV modules are discarded by being removed from service and owner does not intend to re-install (*broken*)
- **Unused** PV Modules (not a retrograde material) is discarded
- **Used** PV Modules becomes a recyclable materials (66260.10)

## § 66273.7.1- Applicability- Cont.

(d) A respondent in an enforcement action ...claims a PV module is not a waste must demonstrate there is a known market or disposition for its use.



# § 66273.9 - Definitions

PV Module –device- that converts photons from the sun into electricity....

- Disassembled PV modules-
  - That contain glass panes that are cracked or damaged
  - Size and shape ...remain identical of a new module, regardless of function.
  
- Do not contain glass
- Removed intact PV modules means
  - Frames, junction boxes, cable...



# § 66273.9 Definition Continued

## Does not mean

- (b) (1) Physically damaged, deteriorated or altered PV modules
- (2) Fractured or fragmented portions ...that are no longer recognizable
- (3) Solar powered electronic devices



# § 66273.32 - Notifications and Reporting

- (a) USEPA notification requirements
- (g) Department notification requirement
- Universal waste handler of PV modules who accepts more than 10,000 kilograms (or 22,000 pounds) of PV modules no later than 30 calendar days.
  - Name
  - ID number
  - Telephone number
  - Mailing address, Physical address
  - Contact person- name, e-mail, telephone number
  - Types of PV modules
  - Any physical separation activities

# § 66273.33 - Universal Waste (UW) Management Requirements

A universal waste handler:

- Manages PV modules in a way that prevents releases of any uw or component of a uw to the environment
- Contain PV module in a manner that prevents breakage and release of hazardous components to the environment
- Intact PV modules or removed intact PV module components are placed in shipping boxes and/or secured by stretch-film on a pallet.

# § 66273.33 - Universal Waste (UW) Management Requirements

A universal waste handler:

- Clean up and place in a container any PV module that is accidentally or unintentionally broken
- The container shall be structurally sound, compatible with the contents of the PV modules, and shall prevent releases of hazardous components to the environment

# § 66273.33 - Universal Waste (UW) Management Requirements

- A universal waste handler
- May remove junction boxes, junction box cables, wires, frames, and other components, and may disassemble PV modules into individual components, modules, or cells in compliance with the notification requirements and ensure
  - Hazardous constituents are not released to the environment
  - Persons performing such removal are familiar with the techniques and safety precautions
  - Disassembly activities to be conducted in designated and labeled areas.

# § 66273.34 - Labeling/Marking

A container with PV modules shall be clearly labeled and Accumulated in designated area labeled as “Universal Waste — PV Modules”



# § 66273.36 - Personnel Training

- Similar to all UW handler requirements
  - personnel who consolidates, sort, treat, recycle, package for transport



- Initial and annual training
- Maintain written training records by date

And include

- The types and hazards associated (hazards due to cadmium, lead, or selenium in PV modules)

# § 66273.39 - Tracking Shipments

Shipments offsite:

- A UW handler shall keep record of each shipment sent
- Form of a log, invoice, manifest, bill of lading, or other shipping document.
- The name and address to which the UW was sent
- The quantity (PV modules); and
- The date of departure of the shipment



# § 66273.51 Prohibitions

- UW Transporter is
- Prohibited from disposing of universal waste
- Prohibited from diluting or treating universal waste, except as a consequence of responding to a release as provided in section
- Prohibited from transporting more than 100 kilograms or 220 pounds of PV modules at any one time unless the PV modules are contained as described in section 66273.33, subsection (d)(1)(B)



# Comments/Suggestions/ Feedback/Questions

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# Where To Find More Information

➤ **Web site:**

<http://www.dtsc.ca.gov/HazardousWaste/PVRegs.cfm>

➤ **Questions to:**

[PVModules@dtsc.ca.gov](mailto:PVModules@dtsc.ca.gov)

